

## NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Division of Fish and Wildlife  
Hale Creek Field Station  
182 Steele Ave Extension  
Gloversville, NY 12078-5710  
P: (518) 773-7318  
[www.dec.ny.gov](http://www.dec.ny.gov)

### **Mercury, PCBs, and Organochlorine Pesticide Analyses of Fish Collected in 2020 in the Vicinity of the Richardson Hill Road Landfill**

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*Analytical Services staff\**

David Bryk, Shabbir Alam, Chloe Armato, Brian Buanno, John Finn, Tanya Jasewicz, Nicholas Sanges, and Katryn Williams

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#### **ABSTRACT**

The Analytical Services Unit (ASU) at Hale Creek Field Station (HCFS) conducted chemical analyses on 37 fish collected in 2020 in the vicinity of Richardson Hill Road Landfill. A total of 39 samples were analyzed for total mercury, total PCBs, and selected organochlorine pesticides. Maximum contaminant levels found in the samples were 0.215 µg/g for total mercury, 0.579 µg/g for total PCBs, 0.00274 µg/g for total DDT, and 0.00546 µg/g for total chlordane. Levels were below detection limits for 4,4'-DDD, 4,4'-DDT, 2,4'-DDE, 2,4'-DDT, heptachlor, heptachlor epoxide, trans-chlordane, cis-chlordane, trans-nonachlor, cis-nonachlor, aldrin, mirex, photomirex, hexachlorocyclohexanes, and hexachlorobenzene.

\* For more information, please contact David Bryk at [David.Bryk@dec.ny.gov](mailto:David.Bryk@dec.ny.gov) or phone (518) 773-7318.



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## SAMPLE INFORMATION

This report consists of results of analyses of 37 fish collected in 2020 from Richardson Hill by Timothy Pokorny and Robert Poprawski of NYSDEC Region 4 and Christopher Nack of Ramboll Consulting. The fish collected were 5 Brown Trout (BT), 25 Creek Chub (CCHUB), 5 Pumpkinseed (PKSD), and 2 Brook Trout (ST). The remaining carcasses for two of the fish were also analyzed. Collection records for the samples are attached at the end of this report.

For two BT, three different results have been reported: the concentration found in the standard fillet (SF), the remaining carcass (CAR), and the whole fish (W). The sample's total weight (WGTG) was measured at the time of collection. During sample processing, individual tissue weights (wt) for the SF and CAR were measured at Hale Creek Field Station; (W) tissue weight is the summation of (wt SF) and (wt CAR). Using the tissue weights (wt SF) and (wt CAR), the whole fish concentration (conc W) was computed using one of the following formulas:

1. If (conc SF) and (conc CAR) were both greater than the method detection limit (MDL):

$$(\text{conc W}) = ((\text{conc SF} * \text{wt SF}) + (\text{conc CAR} * \text{wt CAR})) \div (\text{wt SF} + \text{wt CAR})$$

2. If (conc SF) was below the MDL, whereas (conc CAR) was greater than the MDL, the equation used to compute (conc W) was:

$$(\text{conc W}) = ((1/2 \text{ MDL} * \text{wt SF}) + (\text{conc CAR} * \text{wt CAR})) \div (\text{wt SF} + \text{wt CAR})$$

3. If both (conc SF) and (conc CAR) were below the detection limit, then: (conc W) < MDL.

Calculated whole fish results are indicated by a 0 in the NOONLY (number analyzed) column of the results tables.

## LABORATORY METHODS

The ASU analyzed all 39 samples (2 standard fillet (SF), 31 whole fish (W), 2 remaining carcass (CAR), and 4 whole minus head and viscera (W-H/V) samples) for total mercury, total PCBs, and selected organochlorine pesticides. The ASU Lab Numbers assigned to the SF, W, and W-H/V samples were 20-0097-H through 20-0107-H and 20-0147-H through 20-0172-H. ASU Lab Numbers assigned to the CAR samples were 20-0098-HR and 20-0099-HR. The ASU program name assigned to the samples was Richardson-2020.

**Sample preparation.** Samples were transported to HCFS where they were stored at -20°C or colder. The samples were prepared for analysis in accordance with HCFS Standard Operating Procedure (SOP) *PrepLab4*. All samples were dissected, ground, and homogenized at HCFS. For two fish (ASU Lab Numbers 20-0098-HR through 20-0099-HR), after the standard fillet was removed, the remainder of the fish was also ground, homogenized, and analyzed.

**Mercury analysis.** Samples were analyzed for total mercury in fish tissue by thermal decomposition, amalgamation and atomic absorption spectrophotometry using a Milestone Tri-Cell Direct Mercury Analyzer, DMA-80 [HCFS SOP *HC-405 (Total Mercury)*]. The method is based on EPA method 7473 Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation and Atomic Absorption Spectrophotometry (2007).

**PCB/pesticides analysis.** Samples were analyzed for PCBs and selected organochlorine pesticides by capillary GC-ECD [HCFS SOP *OC1.108 (Organochlorine Residues)*]. At least ten percent of the samples were qualitatively confirmed by capillary GC-MS. Prior to analysis, each sample was freeze-dried and soxhlet-extracted with hexane/acetone (1:1), followed by a florisil cleanup step. All samples were analyzed

for three PCB Aroclors (Aroclors 1242 and sum of Aroclors 1254/1260) and 19 organochlorine pesticides and metabolites (4,4'-DDE; 4,4'-DDD; 4,4'-DDT; 2,4'-DDE; 2,4'-DDT; heptachlor; heptachlor epoxide; trans-chlordane; cis-chlordane; trans-nonachlor; cis-nonachlor; oxychlordane; aldrin; photomirex; mirex; HCB; alpha-HCH; beta-HCH; and gamma-HCH). The method is based on *FDA Pesticide Analytical Manual Vol. 1, 3<sup>rd</sup> edition*, Sections 202, 203 and 304.

## LABORATORY RESULTS

Results are contained in the following tables:

- Table 1: Sample collection, preparation information, and concentration of Mercury in µg/g wet weight;
- Table 2: Percent moisture, percent lipid, and concentrations of PCBs and DDT in µg/g wet weight;
- Table 3: Concentrations of Chlordane in µg/g wet weight.

In each table, the rows are ordered by lab number.

Concentrations were below the detection limit for 4,4'-DDD, 4,4'-DDT, 2,4'-DDE, 2,4'-DDT, heptachlor, heptachlor epoxide, trans-chlordane, cis-chlordane, trans-nonachlor, cis-nonachlor, aldrin, mirex, photomirex, hexachlorocyclohexanes, and hexachlorobenzene.

All sample information and results are also contained in file "REP 21-52 (Richardson-2020).xlsx", formatted in Excel. General information and a data dictionary for the tables and the Excel file are shown in Appendix A. The quality control procedures and quality control results for these analyses are described in Appendix B. The method detection limit (MDL) for each analyte is listed in Table B1 (Appendix B).

**Table 1: Sample Collection, Preparation Information, and Concentration of Mercury in µg/g in Fish Collected in the vicinity of Richardson Hill Road Landfill in 2020**

LABNO	TAGNO	SPP	SDATE	LOCATION	PREP	LENMM	WGTG	TISSUE WGTG	PROGRAM	NOONLY	Hg
20-0097-H	4081340	ST	20200824	Trout Cr-TC2	W	151	22		Richardson-2020	1	0.0842
20-0098-H	4081341	BT	20200824	Trout Cr-TC2	SF	326	262	73.7	Richardson-2020	1	0.160
20-0098-HR	4081341	BT	20200824	Trout Cr-TC2	CAR	326	262	187	Richardson-2020	1	0.130
20-0098-W	4081341	BT	20200824	Trout Cr-TC2	W	326	262	261	Richardson-2020	0	0.138
20-0099-H	4081342	BT	20200824	Trout Cr-TC2	SF	260	153	41.8	Richardson-2020	1	0.191
20-0099-HR	4081342	BT	20200824	Trout Cr-TC2	CAR	260	153	110	Richardson-2020	1	0.215
20-0099-W	4081342	BT	20200824	Trout Cr-TC2	W	260	153	152	Richardson-2020	0	0.208
20-0100-H	4081343	BT	20200824	Trout Cr-TC2	W-H/V	201	73		Richardson-2020	1	0.136
20-0101-H	4081344	BT	20200824	Trout Cr-TC2	W-H/V	193	63		Richardson-2020	1	0.0998
20-0102-H	4081345	BT	20200824	Trout Cr-TC2	W-H/V	173	45		Richardson-2020	1	0.103
20-0103-H	4081346	CCHUB	20200824	Trout Cr-TC2	W	152	34		Richardson-2020	1	0.0607
20-0104-H	4081347	CCHUB	20200824	Trout Cr-TC2	W	157	35		Richardson-2020	1	0.172
20-0105-H	4081348	CCHUB	20200824	Trout Cr-TC2	W	119	16		Richardson-2020	1	0.0805
20-0106-H	4081349	CCHUB	20200824	Trout Cr-TC2	W	99	10		Richardson-2020	1	0.0706
20-0107-H	4081350	CCHUB	20200824	Trout Cr-TC2	W	142	29		Richardson-2020	1	0.0946
20-0147-H	4081926	PKSD	20200824	HHC1	W	103	16		Richardson-2020	1	0.119
20-0148-H	4081927	PKSD	20200824	HHC1	W	109	22		Richardson-2020	1	0.165
20-0149-H	4081928	PKSD	20200824	HHC1	W	103	15		Richardson-2020	1	0.125
20-0150-H	4081929	PKSD	20200824	HHC1	W	94	12		Richardson-2020	1	0.172
20-0151-H	4081930	PKSD	20200824	HHC1	W	104	17		Richardson-2020	1	0.197
20-0152-H	4081921	CCHUB	20200824	HHC1	W	175	52		Richardson-2020	1	0.0425

**Table 1 cont.: Sample Collection, Preparation Information, and Concentration of Mercury in µg/g in Fish Collected in the vicinity of Richardson Hill Road Landfill in 2020**

LABNO	TAGNO	SPP	SDATE	LOCATION	PREP	LENMM	WGTG	TISSUE WGTG	PROGRAM	NOONLY	Hg
20-0153-H	4081922	CCHUB	20200824	HHC1	W	167	40		Richardson-2020	1	0.0437
20-0154-H	4081923	CCHUB	20200824	HHC1	W	140	28		Richardson-2020	1	0.0598
20-0155-H	4081924	CCHUB	20200824	HHC1	W	149	30		Richardson-2020	1	0.0630
20-0156-H	4081925	CCHUB	20200824	HHC1	W	123	16		Richardson-2020	1	0.0540
20-0157-H	4081993	CCHUB	20200824	HHC2	W	130	19		Richardson-2020	1	0.0662
20-0158-H	4081994	CCHUB	20200824	HHC2	w	121	16		Richardson-2020	1	0.0775
20-0159-H	4081995	CCHUB	20200824	HHC2	W	111	11		Richardson-2020	1	0.125
20-0160-H	4081996	CCHUB	20200824	HHC2	W	116	15		Richardson-2020	1	0.0988
20-0161-H	4081997	CCHUB	20200824	HHC2	W	111	10		Richardson-2020	1	0.0182
20-0162-H	4081381	CCHUB	20200824	HHC5	W	146	30		Richardson-2020	1	0.0844
20-0163-H	4081382	CCHUB	20200824	HHC5	W	147	27		Richardson-2020	1	0.195
20-0164-H	4081383	CCHUB	20200824	HHC5	W	144	28		Richardson-2020	1	0.0106
20-0165-H	4081384	CCHUB	20200824	HHC5	W	134	22		Richardson-2020	1	0.108
20-0166-H	4081385	CCHUB	20200824	HHC5	W	138	25		Richardson-2020	1	0.0959
20-0167-H	4081335	CCHUB	20200824	HHC6	W	124	17		Richardson-2020	1	0.0372
20-0168-H	4081336	CCHUB	20200824	HHC6	W	132	20		Richardson-2020	1	0.109
20-0169-H	4081337	CCHUB	20200824	HHC6	W	114	15		Richardson-2020	1	0.0577
20-0170-H	4081338	CCHUB	20200824	HHC6	W	110	11		Richardson-2020	1	0.0859
20-0171-H	4081339	CCHUB	20200824	HHC6	W	116	14		Richardson-2020	1	0.0438
20-0172-H	4081386	ST	20200824	HHC6	W-H/V	161	43		Richardson-2020	1	0.143

Note: See Appendix A for general information and a data dictionary for this table.

**Table 2: Percent Moisture, Percent Lipid, and Concentrations of PCBs and DDT in  $\mu\text{g/g}$  in Fish Collected in the vicinity of Richardson Hill Road Landfill in 2020**

LABNO	TAGNO	SPP	PCTMOIST	PCTLPD	PCB Aroclors			DDT and metabolites					
					AR1242	AR125460	TPCB	PPDDE	PPDDD	PPDDT	OPDDE	OPDDT	TDDT
20-0097-H	4081340	ST	78.41	0.89	0.0199	0.0895	0.109	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0098-H	4081341	BT	77.25	0.90	0.0178	0.0652	0.0830	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0098-HR	4081341	BT	75.55	3.10	0.0549	0.190	0.245	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0098-W	4081341	BT	76.03	2.48	0.0444	0.155	0.199	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0099-H	4081342	BT	78.26	1.23	0.0194	0.0947	0.114	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0099-HR	4081342	BT	74.89	3.39	0.0570	0.278	0.335	0.00274	-0.002	-0.002	-0.005	-0.005	0.00274
20-0099-W	4081342	BT	75.82	2.79	0.0466	0.227	0.274	0.00226	-0.002	-0.002	-0.005	-0.005	0.00226
20-0100-H	4081343	BT	76.92	2.33	0.0237	0.0835	0.107	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0101-H	4081344	BT	77.26	1.36	0.0200	0.0721	0.0921	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0102-H	4081345	BT	77.82	0.92	0.0103	0.0580	0.0683	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0103-H	4081346	CCHUB	79.62	2.06	0.0173	0.0413	0.0586	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0104-H	4081347	CCHUB	75.85	4.16	0.0116	0.0302	0.0418	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0105-H	4081348	CCHUB	78.98	1.84	0.0176	0.0499	0.0675	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0106-H	4081349	CCHUB	77.19	1.88	0.0108	-0.03	0.0108	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0107-H	4081350	CCHUB	76.99	2.51	0.0151	0.0528	0.0679	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0147-H	4081926	PKSD	78.38	0.99	0.0656	0.135	0.201	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0148-H	4081927	PKSD	76.56	1.26	0.0560	0.0367	0.0927	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0149-H	4081928	PKSD	79.28	0.89	0.0297	0.138	0.168	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0150-H	4081929	PKSD	77.92	1.33	0.0484	0.0585	0.107	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0151-H	4081930	PKSD	78.11	0.93	0.0194	0.0318	0.0512	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0152-H	4081921	CCHUB	78.13	1.97	0.242	0.129	0.371	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000

**Table 2 cont.: Percent Moisture, Percent Lipid, and Concentrations of PCBs and DDT in  $\mu\text{g/g}$  in Fish Collected in the vicinity of Richardson Hill Road Landfill in 2020**

LABNO	TAGNO	SPP	PCTMOIST	PCTLPD	PCB Aroclors			DDT and metabolites					
					AR1242	AR125460	TPCB	PPDDE	PPDDD	PPDDT	OPDDE	OPDDT	TDDT
20-0153-H	4081922	CCHUB	78.54	1.68	0.183	0.105	0.288	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0154-H	4081923	CCHUB	78.30	1.93	0.0878	0.0674	0.155	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0155-H	4081924	CCHUB	78.24	1.94	0.160	0.109	0.269	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0156-H	4081925	CCHUB	79.50	2.55	0.328	0.251	0.579	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0157-H	4081993	CCHUB	80.65	1.63	0.110	0.0463	0.156	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0158-H	4081994	CCHUB	78.91	2.63	0.322	0.199	0.521	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0159-H	4081995	CCHUB	81.75	1.00	0.0263	0.0564	0.0827	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0160-H	4081996	CCHUB	80.19	1.41	0.0981	0.114	0.212	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0161-H	4081997	CCHUB	81.91	0.89	0.0483	0.0508	0.0991	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0162-H	4081381	CCHUB	75.07	6.00	0.0536	0.0648	0.118	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0163-H	4081382	CCHUB	76.42	3.44	0.0581	0.0865	0.145	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0164-H	4081383	CCHUB	74.65	5.47	0.100	0.0944	0.194	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0165-H	4081384	CCHUB	75.49	5.63	0.0502	0.0396	0.0898	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0166-H	4081385	CCHUB	75.07	5.79	0.0774	0.0638	0.141	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0167-H	4081335	CCHUB	78.77	1.61	0.0435	0.0971	0.141	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0168-H	4081336	CCHUB	78.15	1.64	0.0377	0.0735	0.111	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0169-H	4081337	CCHUB	80.21	1.06	0.0148	0.0661	0.0809	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0170-H	4081338	CCHUB	78.21	2.60	0.0535	0.0900	0.144	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0171-H	4081339	CCHUB	80.02	1.43	0.0241	0.0490	0.0731	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000
20-0172-H	4081386	ST	75.62	3.87	0.223	0.240	0.463	-0.002	-0.002	-0.002	-0.005	-0.005	0.00000

Note: See Appendix A for general information and a data dictionary for this table.

**Table 3: Concentrations of Chlordane in µg/g in Fish Collected in the vicinity of Richardson Hill Road Landfill in 2020**

LABNO	TAGNO	SPP	Chlordanes					
			OXYCHLOR	TRANSCHL	CISCHL	TRANSNON	CISNON	TCHL
20-0097-H	4081340	ST	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0098-H	4081341	BT	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0098-HR	4081341	BT	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0098-W	4081341	BT	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0099-H	4081342	BT	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0099-HR	4081342	BT	0.00546	-0.005	-0.005	-0.005	-0.005	0.00546
20-0099-W	4081342	BT	0.00464	-0.005	-0.005	-0.005	-0.005	0.00464
20-0100-H	4081343	BT	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0101-H	4081344	BT	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0102-H	4081345	BT	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0103-H	4081346	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0104-H	4081347	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0105-H	4081348	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0106-H	4081349	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0107-H	4081350	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0147-H	4081926	PKSD	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0148-H	4081927	PKSD	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0149-H	4081928	PKSD	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0150-H	4081929	PKSD	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0151-H	4081930	PKSD	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0152-H	4081921	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000



**Table 3 cont.: Concentrations of Chlordane in µg/g in Fish Collected in the vicinity of Richardson Hill Road Landfill in 2020**

LABNO	TAGNO	SPP	Chlordanes					
			OXYCHLOR	TRANSCHL	CISCHL	TRANSNON	CISNON	TCHL
20-0153-H	4081922	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0154-H	4081923	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0155-H	4081924	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0156-H	4081925	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0157-H	4081993	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0158-H	4081994	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0159-H	4081995	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0160-H	4081996	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0161-H	4081997	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0162-H	4081381	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0163-H	4081382	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0164-H	4081383	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0165-H	4081384	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0166-H	4081385	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0167-H	4081335	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0168-H	4081336	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0169-H	4081337	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0170-H	4081338	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0171-H	4081339	CCHUB	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000
20-0172-H	4081386	ST	-0.005	-0.005	-0.005	-0.005	-0.005	0.00000

Note: See Appendix A for general information and a data dictionary for this table

## **APPENDIX A**

### **General information for using tables and electronic file: "REP 21-52 (Richardson-2020).xlsx"**

1. Chemical concentrations are reported in µg/g (ppm) wet weight.
2. The results are reported to no more than three significant figures.
3. A negative concentration indicates the concentration was below the MDL. The number following the negative sign is the MDL.

### **Data dictionary for tables and electronic file: "REP 21-52 (Richardson-2020).xlsx"**

1. LABNO - unique sample lab number assigned at Hale Creek Field Station (character)
2. TAGNO - sample identifier assigned at time of collection and contained in collection records (character)
3. SPP - species code; BT=Brown Trout, CCHUB=Creek Chub, PKSD=Pumpkinseed and ST=Brook Trout (character)
4. SDATE - date sample was collected; format is YYYYMMDD (numeric)
5. LOCATION - location where sample was collected (character)
6. AGE - age of fish in years, if determined (numeric)
7. SEX - sex of fish, if determined; M=male; F=female (character)
8. PREP - preparation method; SF=standard fillet, W=whole fish; W-HV=whole fish minus the head and viscera (character)
9. LENMM - fish length in mm; mean length in mm if sample is composite (numeric)
10. WGTG - fish weight in g; total weight in g if sample is composite (numeric)
11. PROGRAM - program name assigned by Hale Creek Field Station (character)
12. MAXLEN - maximum fish length in mm if sample is composite (numeric)
13. MINLEN - minimum fish length in mm if sample is composite (numeric)
14. SDLEN - standard deviation of fish length in mm if sample is composite (numeric)
15. MAXWGT - maximum fish weight in g if sample is composite (numeric)
16. MINWGT - minimum fish weight in g if sample is composite (numeric)
17. SDWGT - standard deviation of fish weight in g if sample is composite (numeric)
18. NOONLY - number of individuals in sample; if NOONLY is greater than 1, then sample is composite (numeric)
19. PCTMOIST - percent moisture in sample (numeric)
20. PCTLPD - percent lipid in sample (numeric)
21. Hg - mercury (numeric)
22. AR1242 - Aroclor 1242 (numeric)
23. AR125460 - sum of Aroclors 1254 and 1260 (numeric)
24. TPCB - total PCBs; sum of AR1242 and AR125460 (numeric)
25. PPDE - 4,4'-DDE (numeric)
26. PPDD - 4,4'-DDD (numeric)
27. PPDDT - 4,4'-DDT (numeric)
28. OPDE - 2,4'-DDE (numeric)
29. OPDDT - 2,4'-DDT (numeric)
30. TDDT - total DDT; sum of PPDE, PPDD, PPDDT, OPDE and OPDDT (numeric)
31. HEPT - heptachlor (numeric)
32. HEPTEPOX - heptachlor epoxide (numeric)
33. THEPT - total heptachlor; sum of HEPT and HEPTEPOX (numeric)
34. OXYCHLOR - oxychlordane (numeric)
35. TRANSCHL - *trans*-chlordane (numeric)
36. CISCHL - *cis*-chlordane (numeric)
37. TRANSNON - *trans*-nonachlor (numeric)
38. CISONON - *cis*-nonachlor (numeric)
39. TCHL - total chlordanes; sum of OXYCHLOR, TRANSCHL, CISCHL, TRANSNON and CISONON (numeric)
40. ALDRIN - aldrin (numeric)
41. MIREX - mirex (numeric)
42. PHOMIREX - photomirex (numeric)
43. TMIREX - total mirex; sum of MIREX and PHOMIREX (numeric)
44. AHCH - α-hexachlorocyclohexane; α-BHC; α-benzene hexachloride (numeric)
45. BHCH - β-hexachlorocyclohexane; β-BHC; β-benzene hexachloride (numeric)
46. GHCH - γ-hexachlorocyclohexane; γ-BHC; γ-benzene hexachloride; lindane (numeric)
47. THCH - total HCH; sum of AHCH, BHCH and GHCH (numeric)
48. HCB - hexachlorobenzene (numeric)

## **APPENDIX B**

### **Quality control for mercury**

The quality control for mercury included analyses of, at minimum, one reference material sample, one laboratory duplicate, and one method blank for every 20 samples. For the reported analyses, there were three method blanks, seventeen reference material samples, and three duplicate samples. The reference materials were three SRM 2976, three SRM 1947, three DORM-2, and eight DORM-4. For each laboratory duplicate analysis, the absolute value of the relative percent difference (|RPD|) of the initial sample and the duplicate sample averages were determined. The reference material sample and laboratory duplicate results were used to determine accuracy and precision, respectively, of the fish tissue sample results. The procedure blank (laboratory water used during the analysis procedure) was analyzed to determine potential contamination of fish tissue samples.

Criteria for control limits for mercury were based on recommended control limits in *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 1, 3<sup>rd</sup> edition* (USEPA Office of Water, November 2000) with more stringent modifications as recommended by the instrument manufacturer. Control limits for calibration verification Reference Material (SRM 2976, DORM-2, and DORM-4) were percent recovery = 90-110 percent. Control limits for differential Reference Material (SRM 1947 and SRM 1946) were percent recovery = 80-120 percent. The control limit for precision was the relative percent difference (RPD) of laboratory duplicate analyses  $\leq$  20 percent. The MDL was used to assess potential contamination. The statistically derived MDL was 0.004  $\mu\text{g/g}$  Hg wet weight.

Total mercury in each method blank was below the MDL. The percent recovery of total mercury from the reference material was 107 percent for DORM-4; 100 percent for DORM-2; 103 percent for SRM 2976, and 96.2 percent for SRM 1947. The RPD for the laboratory duplicates ranged from 2.66 percent through 3.23 percent. The mean RPD for the laboratory duplicates was 2.88 percent.

### **Quality control for PCBs/organochlorine pesticides**

To better assess the overall accuracy and precision of the large number of organic analytes that are measured, a quality control summary is presented for the analysis dates of August 16, 2021 through September 29, 2021 that includes the analyses of fish from Richardson Hill in 2020. The quality control for this period included analyses of seven matrix spikes, eight reference materials (eight HRM), seven laboratory duplicates, and eight method blanks. One matrix spike, reference material, laboratory duplicate, and method blank were analyzed for every 20 samples. The matrix spikes, reference material samples, and laboratory duplicates were used to determine accuracy and precision of the fish tissue sample results. The method blanks (solvent carried through the entire extraction, clean-up, and analysis procedure) were used to determine potential contamination of the fish tissue samples.

Criteria for control limits were based on recommended control limits in *Guidance for Assessing Chemical Contaminant Data for Use in Fish Advisories, Volume 1, 3<sup>rd</sup> edition* (USEPA Office of Water, November 2000). Control limits for accuracy were percent recovery = 50-150 percent. The control limit for precision was relative standard deviation (RSD)  $\leq$  50 percent. The MDL was used to assess potential contamination.

The control limit for accuracy was determined to be exceeded for an analyte in the study if the mean percent recovery from the matrix spikes or reference material was outside 50-150 percent (see Table B1).

The control limit for precision was determined to be exceeded for an analyte in the study if the RSD of any of the following measures was greater than 50 percent (see Table B1):

- RSD of replicate analyses of matrix spikes or
- RSD of replicate analyses of the reference material or
- mean RSD of laboratory duplicate.

All analytes in the method blanks were below the MDL. The MDLs for the analytes are listed in Table B1.

### **Summary of quality control**

All quality assurance was within control limits for accuracy, precision, and potential contamination in ASU Report 21-52.

**Table B1: Percent Recovery, Precision, and MDLs of PCB Aroclors and Organochlorine Pesticides in Seven Matrix Spikes, Eight Reference Material Samples, and Seven Pairs of Laboratory Duplicates Analyzed at Hale Creek Field Station (August 16, 2021 through September 29, 2021).**

ANALYTE	MATRIX SPIKE		REFERENCE MATERIAL *		LABORATORY DUPLICATES **		MDL (ng/g)
	MEAN %R	RSD (%)	MEAN %R	RSD (%)	# of PAIRS	MEAN RSD %	
Aroclor 1242	101	5.30	-	-	6	3.75	10
Aroclor 1254/1260	101	2.85	-	-	6	2.97	30
SUM Aroclor			113	8.21			-
4,4'-DDE	88.8	3.40	-	-	3	2.58	2
4,4'-DDD	105	4.79	-	-	1	1.60	2
4,4'-DDT	107	8.73	-	-	-	-	2
2,4'-DDE	111	3.62	-	-	-	-	5
2,4'-DDT	110	4.68	-	-	-	-	5
Heptachlor	101	11.3	-	-	-	-	5
Heptachlor epoxide	99.0	3.60	-	-	-	-	5
trans-Chlordane	94.2	2.80	-	-	-	-	5
cis-Chlordane	99.4	2.93	-	-	-	-	5
trans-Nonachlor	102	3.40	-	-	-	-	5
cis-Nonachlor	88.2	5.38	-	-	-	-	5
Oxychlordane	96.5	3.10	-	-	-	-	5
Aldrin	85.5	9.45	-	-	-	-	5
Photomirex	103	2.75	-	-	-	-	5
Mirex	94.6	7.49	-	-	-	-	2
alpha-HCH	67.1	21.3	-	-	-	-	5
beta-HCH	87.2	11.8	-	-	-	-	5
gamma-HCH	79.2	12.9	-	-	-	-	5
HCB	76.5	15.2	-	-	-	-	2

\*Reference material for SUM Aroclor was HRM (N=8).

\*\*Laboratory duplicate RSDs were only used to calculate a mean RSD when the result for each sample in the pair was greater than the MDL.

**APPENDIX C: Chain of Custody and Collection Records**

**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
CHAIN OF CUSTODY**

I, Timothy Pokorny, of 65561 State Hwy 10 Stamford NY 12167 collected the  
(Print Name) (Print Business Address)  
 following on 8/24, 2020 from Trout Creek  
(Date) (Water Body)  
 in the vicinity of Peasey Switch Road  
(Landmark, Village, Road, etc.)  
 Town of Tompkins, in Delaware County.  
 Item(s) 5 brown trout 4081341-45  
1 brook trout 4081340  
5 creek chub 4081346-50  
 Said sample(s) were in my possession and handled according to standard procedures provided to me prior to collection. The sample(s) were placed in the custody of a representative of the New York State Department of Environmental Conservation on 8/24, 2020.  
[Signature] 8/24/20  
Signature Date

I, Timothy Pokorny, received the above mentioned sample(s) on the date specified  
 and assigned identification number(s) 5 brown trout 4081341-45  
1 brook trout 4081340  
5 creek chub 4081346-50 to the sample(s). I  
 have recorded pertinent data for the sample(s) on the attached collection records. The sample(s) remained in  
 my custody until subsequently transferred, prepared or shipped at times and on dates as attested to below.

[Signature] 8/24/20  
Signature Date

SECOND RECIPIENT (Print Name) <u>Joshua Foust</u>	TIME & DATE <u>Oct 6, 2020</u>	PURPOSE OF TRANSFER <u>Deliver Samples</u>
SIGNATURE <u>[Signature]</u>	UNIT <u>NY Fisheries</u>	
THIRD RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
FOURTH RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
RECEIVED IN LABORATORY BY (Print Name) <u>Brian A. Buanno</u>	TIME & DATE <u>0930pm 9-6-20</u>	REMARKS
SIGNATURE <u>Brian A. Buanno</u>	UNIT <u>H.C.F.S.</u>	
LOGGED IN BY (Print Name) <u>Chloe Armato</u>	TIME & DATE <u>1:50pm 10-7-2020</u>	ACCESSION NUMBERS <u>20-0097-H</u> →
SIGNATURE <u>[Signature]</u>	UNIT <u>H.C.F.S.</u>	<u>20-0107-H</u>

After: revised 21 April 2014; Becker: 2017 March 2017





Richardson-2020 Portion weights

Sample ID	TAGNO	Fillet Weight (g)	Remainder Weight (g)	Whole (calculated) weight (g)
20-0098-H	4081341	73.7	187	261
20-0099-H	4081342	41.8	110	152



**NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
CHAIN OF CUSTODY**

I, Timothy Pokorny, of 65561 State Hwy 10 Stamford NY collected the  
(Print Name) (Print Business Address) 12167  
 following on 8/24, 2020 from Herrick Hollow Creek  
(Date) (Water Body)  
 in the vicinity of Richardson Hill Road  
(Landmark, Village, Road, etc.)  
 Town of Masonville, in Delaware County.  
 Item(s) 20 creek chub 4081921-25 4081993-97 4081381-85  
5 pumpkinseed 4081926-30  
1 brook trout 4081386  
 Said sample(s) were in my possession and handled according to standard procedures provided to me prior to collection. The sample(s) were placed in the custody of a representative of the New York State Department of Environmental Conservation on 8/24, 2020.  
[Signature] 8/24/20  
(Signature) Date

I, Timothy Pokorny, received the above mentioned sample(s) on the date specified and assigned identification number(s) 20 creek chub 4081921-25 4081993-97 4081381-85  
5 pumpkinseed 4081926-30 1 brook trout 4081386 to the sample(s). I have recorded pertinent data for the sample(s) on the attached collection records. The sample(s) remained in my custody until subsequently transferred, prepared or shipped at times and on dates as attested to below.

[Signature] 8/24/20  
Signature Date

SECOND RECIPIENT (Print Name) <u>Joshua Faust</u>	TIME & DATE <u>Oct 6, 2020</u>	PURPOSE OF TRANSFER <u>Deliver Samples</u>
SIGNATURE <u>[Signature]</u>	UNIT <u>Rt Fisheries</u>	
THIRD RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
FOURTH RECIPIENT (Print Name)	TIME & DATE	PURPOSE OF TRANSFER
SIGNATURE	UNIT	
RECEIVED IN LABORATORY BY (Print Name) <u>Brian A. Buanno</u>	TIME & DATE <u>0930 hrs. 9-6-20</u>	REMARKS
SIGNATURE <u>Brian A. Buanno</u>	UNIT <u>H.C.F.S.</u>	
LOGGED IN BY (Print Name) <u>Chloe Armato</u>	TIME & DATE <u>1:01 pm 10-22-2020</u>	ACCESSION NUMBERS <u>20-0171-H</u> →
SIGNATURE <u>[Signature]</u>	UNIT <u>H.C.F.S.</u>	<u>20-0172-H</u>



NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION  
DIVISION OF FISH AND WILDLIFE  
FISH COLLECTION RECORD

page 2 of 4

Project and Site Name Amphenol Richardson Hill Landfill PCB testing DEC Region 4  
 Collections made by (names) Timothy Pokorny, Robert Poprawski, Christopher Nock (Pamoll consulting)  
 Sampling Method: ☒ Electrofishing ☐ Gill netting ☐ Trap netting ☐ Trawling ☐ Seining ☐ Angling ☐ Other \_\_\_\_\_  
 Preservation Method: ☒ Freezing ☐ Other \_\_\_\_\_ Notes (SWFDB survey number): 420020

FOR LAB USE ONLY - LAB ENTRY NO.	COLLECTION OR TAG NO.	SPECIES	DATE TAKEN	LOCATION	AGE	SEX & OR REPROD. CONDIT	LENGTH (mm)	WEIGHT (g)	REMARKS
20-0152-H	4081921	Creek chub	8/24/20	Herring Hollow Creek Richardson Hill Rd			175	52	HHC1
20-0153-H	4081922	Creek chub	8/24/20	"			167	40	HHC1
20-0154-H	4081923	Creek chub	8/24/20	"			140	28	HHC1
20-0155-H	4081924	Creek chub	8/24/20	"			149	30	HHC1
20-0156-H	4081925	Creek chub	8/24/20	"			123	16	HHC1
20-0157-H	4081993	Creek chub	8/24/20	"			130	19	HHC2
20-0158-H	4081994	Creek chub	8/24/20	"			121	16	HHC2
20-0159-H	4081995	Creek chub	8/24/20	"			111	11	HHC2
20-0160-H	4081996	Creek chub	8/24/20	"			116	15	HHC2
20-0161-H	4081997	Creek chub	8/24/20	"			111	10	HHC2
20-0162-H	4081381	Creek chub	8/24/20	"			146	30	HHC5
20-0163-H	4081382	Creek chub	8/24/20	"			147	27	HHC5
20-0164-H	4081383	Creek chub	8/24/20	"			144	28	HHC5
20-0165-H	4081384	Creek chub	8/24/20	"			134	22	HHC5
20-0166-H	4081385	Creek chub	8/24/20	"			138	25	HHC5

richter: revised 2011, 5/7/15, 10/4/16, 3/20/17; becker: 3/23/17



